Appendix A
References

APPENDIX A: REFERENCES

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Appendix B
DEIA Checklist

APPENDIX B: DEIA CHECKLIST

	Item	Page/Figure	DOE's Comments
Background of Proposed Project			
1.1	Project Proponent ▪ Name, address, telephone and fax. ▪ Name of contact person.	 Page 1-2 Page 1-2	
1.2	Site location ▪ Location map or key plan ▪ Location co-ordinate	 Figure 1-1 Page 1-1	
1.3	Project alignment ▪ Length of the alignment ▪ Layout plan showing alignment	 Page 1-1 Figure 1-1	
1.4	Statement of need Justification for proposed Project	Page 2-1 to 2-7	
1.5	▪ Alignment Selection Options	Page 4-1 to 4-17 Figure 4-2 to Figure 4-11	
1.6	Project concept and layout ▪ Concept/theme of Project ▪ Layout plan showing proposed components	 Page 3-1 to 3-3 Figure 3-1 to Figure 3-4	
1.7	Project activities Outline of main activities (type & scale) involved in the proposed Project	 Page 3-6 to 3-33 Figure 3-5 to Figure 3-12	
1.8	Schedule of implementation Development schedule showing phases of development and time frame involved	Page 3-34	
Consultant Information			
2.1	EIA consultant Name, Address, Academic Qualifications and Authorized signatures	Page 1-3 and Declaration form and project team	
Maps and Plans			
3.1	Geological and soil maps Maps showing geological units and soil types	 Figure 5-3, Figure 5-5, Figure 5-6 and Figure 5-7	
3.2	Drainage and Hydrological Map Hydrological map indicating river systems and catchment areas	 Figure 5-12	
3.3	Land use plan	Figure 5-8a to Figure 5-8g and Figure 5-9	
3.4	Location of sampling /monitoring stations	Figure 5-14a to Figure 5-14d	
3.5	Photographs (land, aerial or satellite image) showing existing physical condition and landform of Project site and surrounding areas	Figure 5-8a to Figure 5-8g	

APPENDIX B: DEIA CHECKLIST

	Item	Page/Figure	DOE's Comments
Existing Environmental Database			
4.1	Terrain features ▪ Description of terrain levels based on topography map	Page 5-1 to 5-2 Figure 5-1	
4.2	Geology, Subsoil and Groundwater	Page 5-3 to 5-13 Figure 5-3 to Figure 5-7	
4.3	Land use ▪ Land use characteristic of the Project site as well as the impact areas	Page 5-13 to 5-31 Figure 5-8a to Figure 5-8g and Figure 5-9	
4.4	Assessment of climatological data	Page 5-34 to 5-35 Figure 5-10 and Figure 5-11	
4.5	Drainage and Hydrology ▪ Drainage system in Project site ▪ Groundwater source ▪ Flood prone areas	Page 5-35 to 5-39 & (Figure 5-12 & Figure 5-13) Page 5-37 to 5-39	
4.6	Water Quality ▪ Baseline monitoring results for pH, DO, BOD, TSS, NH3-N, oil & grease, heavy metals, etc.	Page 5-39 to 5-49 Figure 5-14a to 5-14c	
4.7	Air Quality ▪ Baseline monitoring results for parameters such as TSP, SOx, NOx, HCl, Dioxin & Furan, etc.	Page 5-47 to 5-49 Figure 5-14a to 5-14c	
4.8	Noise and vibration ▪ Baseline noise and vibration levels	Page 5-49 to 5-67 Figure 5-14a to 5-14c	
4.9	Socio-economic	Page 5-77 to 5-89	
4.10	Traffic	Page 5-67 to 5-76	
4.11	Ecology study	Page 5-89	
Impact & Mitigation Analyses Information			
Pre Construction Phase			
5.1	Soil investigation, land acquisition and utilities relocation	Page 7-1 to 7-5	
Construction Phase			
5.2	Traffic	Page 7-7 to 7-19	
5.3	Noise Pollution	Page 7-19 to 7-53	
5.4	Public Safety	Page 7-63 to 7-71	
5.5	Social Impact	Page 7-104 to 7-106	

APPENDIX B: DEIA CHECKLIST

	Item	Page/Figure	DOE's Comments
5.6	Soil Erosion and Sedimentation	Page 7-85 to 7-93 Figure 7-11 to 7-13	
5.7	Air Pollution	Page 7-72 to 7-84	
5.8	Flooding and Hydrology Changes	Page 7-94 to 7-95	
5.9	Water Pollution	Page 7-96 to 7-101 Figure 7-14	
5.10	Waste Management	Page 7-101 to 7-103	
Operational Phase			
5.11	Noise and Vibration Pollution Noise and vibration prediction from operation, conveyer and traffic	Page 8-2 to 8-136	
5.12	Traffic	Page 8-137 to 8-149	
5.13	Visual Impact	Page 8-150 to 8-168	
5.14	Air Pollution Prediction of air pollutants concentration	Page 8-169 to 8-198	
5.15	Public Safety	Page 8-204 to 8-210	
5.16	Socio-economic	Page 8-199 to 8-204	
5.17	Flooding	Page 8-211 to 8-212	
5.18	Depot Operation	Page 8-212 to 8-214	
Residual Issues			
6.1	Significant impacts in terms of air quality, human health, waste management, etc.	Page 9-1 to 9-3	
Environmental Management Framework			
7.1	Organization ▪ Assignment and authorization of personnel with responsibilities to perform task enforce measures identified in the EIA	Page 10-5 to 10-6	
7.2	Monitoring Programme ▪ Outline programme to inspect and monitor the water, air and noise	Page 10-10 to 10-18 Figure 10-2a to Figure 10-2d	

APPENDIX B: DEIA CHECKLIST

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Appendix C
Terms Of References Approval

JABATAN ALAM SEKITAR
KEMENTERIAN SUMBER ASLI & ALAM SEKITAR
ARAS 3, PODIUM 3, WISMA SUMBER ASLI
NO. 25, PERSIARAN PERDANA, PRESINT 4
62574 W. P. PUTRAJAYA
Web : http://www.doe.gov.my

Telefon : 603-8871 2000
Faks : 603-8889 1045
(Penilaian)
603-8888 9987 /
603-8889 1040
(Pentadbiran)

PENGIKTIRAFAN MS ISO 9001:2008
NO.SIJIL : AR 5141

Ruj.Kami: AS(PN)91/110/622/1487 (17)

"Pemuliharaan Alam Sekitar, Tanggungjawab Bersama"

Tarikh: 12 Februari 2015

Ketua Pegawai Eksekutif
Mass Rapid Transit Corporation Sdn Bhd (MRT Corp)
Tingkat 5, Menara I & P 1
No. 46, Jalan Dungun
Bukit Damansara
50490 KUALA LUMPUR **No. Faks : 03-2095 2121**

YBhg. Datuk,

BIDANG RUJUKAN (*TERMS OF REFERENCE,* TOR) BAGI LAPORAN KAJIAN PENILAIAN KESAN KEPADA ALAM SEKELILING (EIA) TERPERINCI BAGI PROJEK MASS RAPID TRANSIT LALUAN 2 : SG. BULOH- SERDANG- PUTRAJAYA OLEH MASS RAPID TRANSIT CORPORATION SDN BHD

Saya dengan hormatnya diarah merujuk kepada perkara di atas. Mesyuarat Panel Pengulas yang telah diadakan di Jabatan ini pada 19 Disember 2014 bagi membincangkan cadangan Bidang Rujukan projek di atas serta dokumen Bidang Rujukan yang dikemaskini (*Revised TOR*) yang telah dikemukakan oleh Jururunding EIA, ERE Consulting Group Sdn. Bhd. bertarikh 23 Januari 2015, rujukan MRTC-JAS-SSP-LET-000176 yang diterima Jabatan ini pada 26 Januari 2015 adalah berkaitan.

2. Setelah menyemak dan meneliti **Bidang Rujukan yang dikemaskini (*Revised TOR*) bertajuk PROJEK MASS RAPID TRANSIT LALUAN 2 : SG. BULOH- SERDANG- PUTRAJAYA – *REVISED TERMS OF REFERENCE FOR DETAILED ENVIRONMENTAL IMPACT ASSESSMENT* bertarikh 23 Januari 2015**, sukacita dimaklumkan bahawa Bidang Rujukan (*TOR)* bagi cadangan projek di atas **DISAHKAN dan tertakluk kepada perkara-perkara berikut yang perlu diambilkira di peringkat kajian EIA Terperinci kelak:-**

(i) Kesemua ulasan yang diterima oleh Jabatan ini dan dikemukakan kepada pihak YBhg. Datuk iaitu daripada:-

a. Agensi-agensi berkaitan;

b. Pakar-Pakar Pengulas Individu; dan

c. Perkara-perkara yang dibincangkan dan diminitkan dalam Minit Mesyuarat Panel Pengulas yang dikemukakan melalui surat Jabatan ini bertarikh **9 Januari 2015, rujukan AS(PN)91/110/622/1487 (10).**

(ii) Laporan EIA Terperinci yang dikemukakan hendaklah lengkap dan jelas merangkumi skop-skop kajian EIA seperti yang telah dibincangkan di dalam Mesyuarat Panel Pengulas yang diadakan pada 19 Disember 2014, termasuklah ketepatan data serta cara persembahan dibuat;

(iii) Pakar geoteknikal yang berkelayakan hendaklah dilantik sebagai ahli di dalam "*EIA Study Team*" dalam menjalankan kajian berkaitan geoteknikal bagi kajian EIA cadangan projek ini;

(iv) Laporan EIA hendaklah menyertakan pelan guna tanah terkini, terperinci dan lengkap serta jelas menunjukkan penerima sensitif di sepanjang cadangan jajaran hendaklah disertakan;

(v) Kajian geologi yang merangkumi perkara- perkara berikut :-

(a) Semua maklumat geologi yang boleh dicerap di kawasan cadangan projek dan sekitarnya;

(b) Maklumat geologi yang lengkap serta terperinci dan boleh digunapakai dalam menilai kesesuaian cadangan projek;

(c) Kekangan geologi (*geological constraint*) di kawasan cadangan projek dan sekitarnya;

(d) Potensi geobencana (kegagalan cerun, pemendapan, lubang benam dan lain-lain);

(e) Mengemukakan peta geologi, peta topografi, peta pengkelasan terain dan profil geologi subpermukaan pada skala yang sesuai; dan

(f) Menyatakan kaedah siasatan subpermukaan yang sesuai, terperinci dan komprehensif seperti kaedah lubang gerusi dan geofizik terutama di kawasan yang batuan dasarnya terdiri dari batu kapur.

(vi) Kajian ke atas flora dan fauna yang merangkumi perkara-perkara berikut :-

(a) *Wildlife* survey di Hutan Simpan Sg. Puteh; dan

(b) Konflik manusia-hidupan liar di sekitar Huta Simpan Sg. Puteh dan kawasan berhutan di sekitar jajaran Laluan 2.

(vii) Lokasi stesen-stesen persampelan bagi pengukuran garis dasar untuk kesemua parameter yang akan dikaji hendaklah ditunjukkan dengan jelas di dalam pelan/peta. Pengukuran garis dasar bunyi bising bagi waktu siang hendaklah dijalankan dari 7.00 pagi hingga 10.00 malam manakala bagi waktu malam hendaklah dijalankan dari 10.00 malam hingga 7.00 pagi;

(viii) Kajian impak daripada aktiviti kerja tanah bagi penyediaan tapak cadangan projek hendaklah diperincikan dengan jelas di dalam Laporan EIA Terperinci. Kajian *Erosion and Sedimentation Control (ESC)* perlu dijalankan mengikut ***"Guidance Document For Addressing Soil Erosion and Sediment Control Aspects in Environmental Impact Assessment (EIA) Report"*, terbitan Jabatan Alam Sekitar. Laporan ESC perlu disertakan dengan pelan** konsep (*conceptual plan*) yang menunjukkan dengan jelas *Best Management Practices* (BMPs) bagi mengawal hakisan dan sedimen di tapak cadangan projek semasa kerja-kerja tanah dan pembinaan dijalankan. Jururunding yang menjalankan kajian hakisan tanah dan sedimen hendaklah berdaftar dengan Jabatan Alam Sekitar dan mempunyai pensijilan "*Certified Professional on Erosion and Sediment Control*" (CPESC);

(ix) Kesemua langkah kawalan yang dinyatakan dalam Laporan EIA Terperinci termasuk *Best Management Practices (BMPs)* bagi kawalan air larian permukaan, hakisan dan kelodakan dan

perparitan perlu dikaji bagi setiap impak kritikal yang dijangkakan dan hendaklah *project specific* serta jelas supaya ianya boleh diterjemahkan di dalam Pelan Pengurusan Alam Sekitar (*Environmental Management Plan, EMP*) kelak untuk dilaksanakan secara berkesan dari segi pemantauan dan sebagainya;

(x) Komitmen daripada pemaju projek untuk mengadakan langkah-langkah kawalan (*mitigating measures*) yang berkesan dan terbukti dapat meminimakan impak negatif kepada alam sekeliling.

(xi) Penjelasan mengenai jumlah dan kaedah pengurusan sisa pepejal dan sisa bahan binaan dari aktiviti cadangan projek ini yang merangkumi sisa biomas akibat kerja-kerja pembersihan hutan di kawasan depoh, sisa bahan kerukan dari kerja-kerja bawah tanah yang dijalankan;

(xii) Maklumat dan data yang digunakan di dalam kajian EIA perlulah terkini (*current data*) dan mengambilkira keperluan kajian data-data sepanjang tahun kebelakangan sebagai perbandingan dan sebahagian daripada *modelling* yang dijalankan;

(xiii) Hanya analisa yang dijalankan oleh makmal yang mempunyai Sijil Akreditasi (SAMM) diterima di dalam kajian EIA dan keputusannya hendaklah dimasukkan ke dalam laporan EIA.

(xiv) Jadual Pelaksanaan Projek hendaklah disertakan;

(xv) Penyediaan dokumen '*Emergency Response Plan*' (ERP) juga perlu dirancang di peringkat penyediaan Laporan EIA Terperinci; dan

(xvi) Rujukan garispanduan-garispanduan yang terlibat hendaklah berpandukan garispanduan yang terkini seperti *A Handbook of EIA Guidelines,* Garispanduan Bunyi Bising terbitan JAS, *Guidance Document for the Preparation and Submission of Environmental Management Plans* (EMPs), *Guidance Document for the Preparation of Erosion and Sediment Control Plans* (ESCPs) dan sebagainya;

3. Sehubungan itu, dengan mengambilkira perkara-perkara yang dinyatakan di atas, pihak YBhg. Datuk boleh meneruskan kajian dan penyediaan Laporan EIA Terperinci. YBhg. Datuk bolehlah berpandukan kepada senarai semak pematuhan kepada Bidang Rujukan yang disahkan

mengikut format seperti di **Lampiran 2** bagi memastikan kesemua skop kajian yang dinyatakan di atas diambilkira di dalam Kajian EIA Terperinci kelak.

4. Dimaklumkan bahawa Laporan EIA Terperinci yang lengkap bagi semua laporan EIA yang sedang dinilai perlu dipaparkan di laman web rasmi Jabatan ini. Oleh yang demikian, sesalinan CD yang mengandungi "*soft copy*" Laporan EIA Terperinci berkenaan (format pdf bersekuriti) hendaklah dikemukakan kepada Jabatan Alam Sekitar Ibu Pejabat dan sesalinan kepada Jabatan Alam Sekitar Negeri Selangor. Laporan Utama perlu dipecahkan mengikut bab. Saiz setiap fail PDF tersebut hendaklah tidak melebihi 100 MB. Di samping itu, Ringkasan Eksekutif dalam bentuk "*soft copy*" juga hendaklah dikemukakan secara berasingan dengan "*soft copy*" Laporan EIA Terperinci untuk tujuan paparan di laman web rasmi Jabatan ini. Selain daripada ringkasan isu dan keputusan kajian, kandungan Ringkasan Eksekutif hendaklah juga mengandungi perkara-perkara berikut:-

- ***Name/title of Project.***
- ***Name & Contact Details of the Project Proponent (Contact Person, Address, Tel, Fax & Email).***
- ***Name of the EIA Consultant (firm) (Contact Person, Address, Tel, Fax & Email).***
- ***Location of the project (including where applicable, coordinates, lot numbers, mukim and district name).***
- ***Relevant maps showing project location and sensitive receptors.***
- ***Flow diagram of main processes (for industrial and other relevant activities).***

5. Walaupun Laporan EIA Terperinci dan Ringkasan Eksekutif dipaparkan di halaman web rasmi Jabatan ini, prosedur Laporan EIA Terperinci secara '*hard copy*' masih kekal dan diperlukan untuk tujuan pameran awam (*public display*) di perpustakaan dan tempat lain yang ditetapkan selain diperlukan untuk tujuan kawalan dokumen di dalam fail Jabatan.

6. Pihak YBhg. Datuk juga hendaklah mengemukakan semua data mentah (*raw data*) yang digunakan sebagai input di dalam kajian EIA Terperinci, dalam bentuk "*hard copy*" di dalam "*EIA Main Report*" atau sebagai apendiks. Manakala sesalinan CD yang mengandungi "*soft copy*" data berkenaan hendaklah dikemukakan kepada Jabatan Alam Sekitar Ibu Pejabat dan apendiks ini perlu dipecahkan mengikut bab dan saiz setiap fail PDF tersebut hendaklah tidak melebihi 100 MB.

7. Jabatan ini juga ingin menarik perhatian pihak YBhg. Datuk bahawa pengesahan ke atas Bidang Rujukan ini **hanya sah diterima pakai** dalam tempoh **satu (1) tahun dari tarikh surat ini dikeluarkan dan akan terbatal sekiranya Kajian EIA Terperinci tidak dikemukakan kepada Jabatan ini dalam tempoh tersebut**.

Sekian, dimaklumkan.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah,

(NORLIN JAAFAR)
b.p.: Ketua Pengarah Alam Sekitar Malaysia

s.k.

Pengarah
Jabatan Alam Sekitar Negeri Selangor
Tingkat 12-14, Wisma SunwayMas
Jalan Tengku Ampuan Zabedah C9/C
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SELANGOR DARUL EHSAN No Faks : 03-5519 4788

Pengarah
Jabatan Alam Sekitar Wilayah Persekutuan Kuala Lumpur
Tingkat 1-2, Wisma SCA
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57100 KUALA LUMPUR No Faks : 03-9221 6437

Pengarah Urusan
ERE Consulting Group Sdn. Bhd.
9, Jalan USJ 21/6
47630 Subang Jaya
SELANGOR DARUL EHSAN No.Faks : 03-8024 2320

LAMPIRAN 2

SENARAI SEMAK BAGI PEMATUHAN KE ATAS "REVISED TOR"

BIL	Perkara (item) dalam "Revised TOR" (sila nyatakan)	Rujukan Dalam Laporan EIA Terperinci (sila nyatakan bab dan mukasurat yang terlibat)	Ulasan JAS (kosongkan)

Appendix D
Baseline Laboratory Analysis Report

REPORT ON

AMBIENT AIR QUALITY MONITORING

FOR

ERE CONSULTING GROUP SDN BHD,
NO.9 JALAN USJ 21/6,
47630 SUBANG JAYA, SELANGOR.

PROJECT:
MRT PROJECT (SSP LINE)

PROJECT REFERENCE	: 1138 – 1140/1237 – 1238/2015/03
REPORTING DATE	: 31/03/2015
SAMPLING DATE	: 09 - 18/03/2015

Performed by:
UiTM – A & A Laboratory
We Make the Future Greener

TABLE OF CONTENT

1.0 INTRODUCTION

SO_x NO_x Asia Sdn. Bhd. (SNA) had commissioned UiTM – A&A Laboratory of A&A Scientific Resources Sdn. Bhd. to conduct an Ambient Air Quality Monitoring exercise for MRT Project (SSP Line).

The monitoring was performed from 26th February 2014 – 19th March 2015.

2.0 SCOPE OF WORK

Scope of work and responsibilities of UiTM – A & A Laboratory are as follows:

- To perform an ambient air quality monitoring at identified sampling locations.
- To prepare and submit a ***"Ambient Air Quality Monitoring Report for MRT 2 Project"*** to SOx NOx Asia Sdn. Bhd.

3.0 AMBIENT AIR QUALITY MONITORING

3.1 Sampling Points

- A1: Nearby Dewi Sri Maha Mariamman temple (N 3° 11'56.44", E 101° 37'3.31")
- A2: Nearby Kg Batu PPR Flat (N 3° 12'11.05", E 101° 40'20.66")
- A3: Nearby General Hospital Kuala Lumpur (N 3° 10'9.29", E 101° 42'16.76")
- A4: Nearby Sekolah Kebangsaan Jalan Raja Muda, Kampung Baru (N 3° 10'4.75", E 101° 42'29.40")

  A5: Nearby Desa Green Service Apartment, Sungai Besi (N 3° 6'22.62", E 101° 41'41.70")
- A6: Nearby the Leafz Apartment, Sungai Besi (N 3° 5'7.24", E 101° 41'45.24")
- A7: Within Taman Naga Emas (N 3° 4'39.12", E 101° 41'56.70")
- A8: Nearby Sungai Besi LRT Station (N 3° 3'52.63", E 101° 42'30.63")
- A9: Nearby Plaza Serdang Raya (N 3° 2'33.66", E 101° 42'18.00")
- A10: Nearby Masjid Al-Firdaus, Taman Kembangsari (N 3° 1'13.29", E 101° 42'31.57")
- A11: Border of UPM and MARDI (N 3° 0'35.63", E 101° 42'30.28")
- A12: Nearby open space at Pinggiran Putra Petron Station, Equine Park (N 2° 59'21.63", E 101° 40'22.55")
- A13: Nearby Amigo Clubhouse, Bandar 16 Sierra (N 2° 58'10.74", E 101° 39'17.20")

3.2 Sampling Date

- A1 – (26th - 27th February 2014)
- A2 – (27th - 28th February 2014)
- A3 – (03rd - 04th March 2014)
- A10 - (17th - 18th March 2014)
- A11- (13th - 14th March 2014)
- A4 – (02th - 03th December 2014)
- A12 -(04th – 05th Disember 2014)
- A13 -(03th – 04th Disember 2014)
- A9 - (09th - 10th March 2015)
- A8 – (10th - 11th March 2015)
- A6 – (11th - 12th March 2015)
- A7 – (17th – 18th March 2015)
- A5 – (18th - 19th March 2015)

3.3 Sampling Personnel

- Mr. Mohd Fadly Sukar @ Idros
- Mr. Muhamad Affendi Abas

3.4 Monitoring Parameters, Methodology and Instrumentation

The environmental air samples were collected from the fixed point by drawing the air from the surrounding area through the absorbing media via a precalibrated portable pump stationed at the fixed points.

All the samples have been sampled for the parameters TSP, PM_{10} and NO_2 for 24 hours monitoring by using **High Volume Sampler (HVS)**:-

1) Parameter : Total Suspended Particulate (TSP) & Particulate Matter less than 10 micron (PM_{10})
   Method Specification : APHA IC 11101-01-70T
   Sampling Duration : 24 hours

Description

Air is drawn into a covered housing by means of a high flow rate blower at a flow rate of 1.13 m^3/min that allows suspended particles having diameter of less than 100 u (aerodynamic diameter) to pass the filter surface. The mass concentration of suspended particulates in the ambient air ($\mu g/m^3$) is computed by measuring the mass of collected particulate and the volume of air sampled.

2) Parameter : Nitrogen Dioxide as NO_2
   Method Specification : APHA 42602-03-73T
   Sampling Duration : 24 hours

Description

Nitrogen Dioxide is absorbed from the air by aqueous triethanolamine solution; subsequent analysis is done using an azo-dye forming agent. The color produced by the reagent is measured in a spectrophotometer at 540nm.

3) Parameter : Carbon Monoxide as CO
Monitoring Device : KITAGAWA Gas Detector Tube System
Detector Tube : 106SC Carbon Monoxide (measuring range: 1 - 50ppm)
Sampling Duration : 4 minutes

Description

Carbon Monoxide, CO is pump into the detector tube for 4 minutes duration or until the completion of sampling is confirmed with the flow indicator of the pump. The CO concentration is determined by reading the scale at the maximum point of stained layer.

3.5 Relevant Guidelines

STANDARD REFERENCE: MALAYSIAN AMBIENT AIR QUALITY GUIDELINES(MAAQG)

Pollutant	Averaging Time	Malaysian Guidelines	
		(ppm)	($\mu g/m^3$)
Ozone	1 hour 8 hour	0.10 0.06	200.0 120.0
Carbon** Monoxide	1 hour 8 hour	30 9	35 10
Nitrogen Dioxide	1 hour 24 hour	0.17 0.04	320 75
Sulphur Dioxide	1 hour 24 hour	0.13 0.04	320.0 10.0
Particulate Matter (PM_{10})	24 hours 1 year	-	150 50
Total Suspended Particulate (TSP)	24 hours 1 year	-	260 90
Lead	3 month	-	1.5

Note: ** mg/m^3

4.0 RESULTS OF ANALYSIS

Parameter	Unit	A1	A2	Specification	
				Averaging Time	MAAQG
Total Suspended Particulate (TSP)	$\mu g/m^3$	92	65	24 hours	260
Particulate Matter less than 10 micron (PM_{10})	$\mu g/m^3$	60	34	24 hours	150
Carbon Monoxide as CO	ppm	5	1	1 hour	30
Nitrogen Dioxide as NO_2	$\mu g/m^3$	ND(<2)	ND(<2)	24 hours	75

** MAAQG: Malaysian Ambient Air Quality Guidelines*
Please refer to Certificate of Analysis: **CN 0394-2014**

Parameter	Unit	A3	A4	Specification	
				Averaging Time	MAAQG
Total Suspended Particulate (TSP)	$\mu g/m^3$	72	85	24 hours	260
Particulate Matter less than 10 micron (PM_{10})	$\mu g/m^3$	38	67	24 hours	150
Carbon Monoxide as CO	ppm	1	ND(<0)	1 hour	30
Nitrogen Dioxide as NO_2	$\mu g/m^3$	ND(<2)	ND(<2)	24 hours	75

** MAAQG: Malaysian Ambient Air Quality Guidelines*
Please refer to Certificate of Analysis: **CN 0394-2014 and CN 1256-2014** respectively

Parameter	Unit	A5	A6	Specification	
				Averaging Time	MAAQG
Total Suspended Particulate (TSP)	$\mu g/m^3$	94	85	24 hours	260
Particulate Matter less than 10 micron (PM_{10})	$\mu g/m^3$	58	53	24 hours	150
Carbon Monoxide as CO	ppm	1	1	1 hour	30
Nitrogen Dioxide as NO_2	$\mu g/m^3$	ND(<2)	ND(<2)	24 hours	75

** MAAQG: Malaysian Ambient Air Quality Guidelines*
Please refer to Certificate of Analysis: **CN 0370-2015**

Parameter	Unit	A7	A8	Specification	
				Averaging Time	MAAQG
Total Suspended Particulate	$\mu g/m^3$	72	89	24 hours	260
Particulate Matter (PM_{10}) less than 10 micron	$\mu g/m^3$	45	55	24 hours	150
Carbon Monoxide	ppm	1	2	1 hour	30
Nitrogen Dioxide as NO_2	$\mu g/m^3$	ND(<2)	ND(<2)	24 hours	75

** MAAQG: Malaysian Ambient Air Quality Guidelines*
Please refer to Certificate of Analysis: **CN 0370-2014**

Parameter	Unit	A9	A10	Specification	
				Averaging Time	MAAQG
Total Suspended Particulate (TSP)	$\mu g/m^3$	76	78	24 hours	260
Particulate Matter less than 10 micron (PM_{10})	$\mu g/m^3$	46	44	24 hours	150
Carbon Monoxide as CO	ppm	1	ND(<0)	1 hour	30
Nitrogen Dioxide as NO_2	$\mu g/m^3$	ND(<2)	ND(<2)	24 hours	75

** MAAQG: Malaysian Ambient Air Quality Guidelines*
Please refer to Certificate of Analysis: **CN 0370-2014 and CN 0394 - 2015** respectively

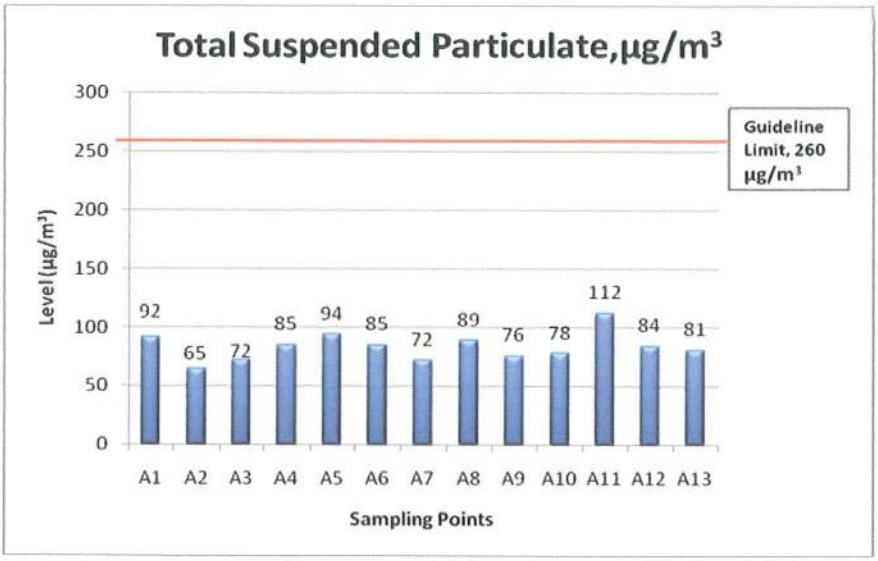
Parameter	Unit	A11	A12	Specification	
				Averaging Time	MAAQG
Total Suspended Particulate (TSP)	$\mu g/m^3$	112	84	24 hours	260
Particulate Matter less than 10 micron (PM_{10})	$\mu g/m^3$	62	65	24 hours	150
Carbon Monoxide as CO	ppm	1	ND(<0)	1 hour	30
Nitrogen Dioxide as NO_2	$\mu g/m^3$	ND(<2)	ND(<2)	24 hours	75

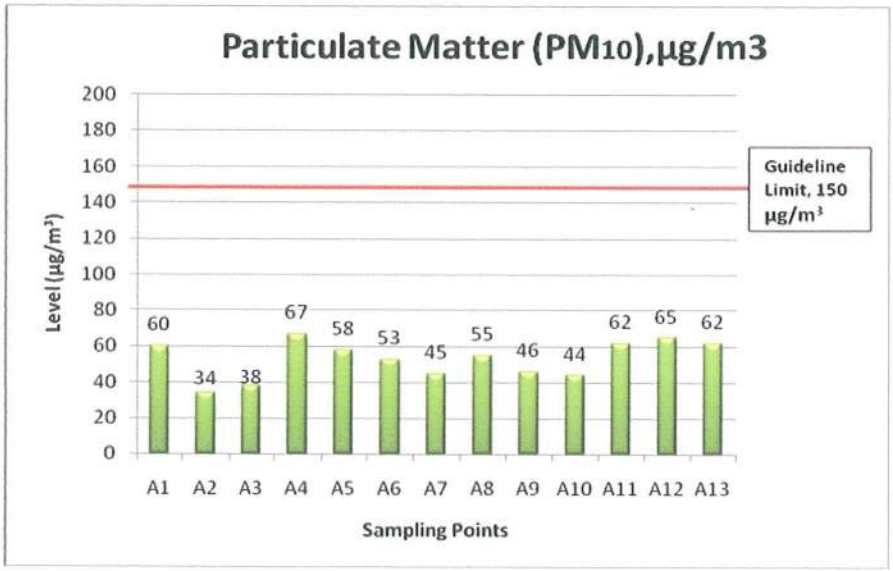
** MAAQG: Malaysian Ambient Air Quality Guidelines*
Please refer to Certificate of Analysis: **CN 0394-2014 and CN 1256-2014** respectively

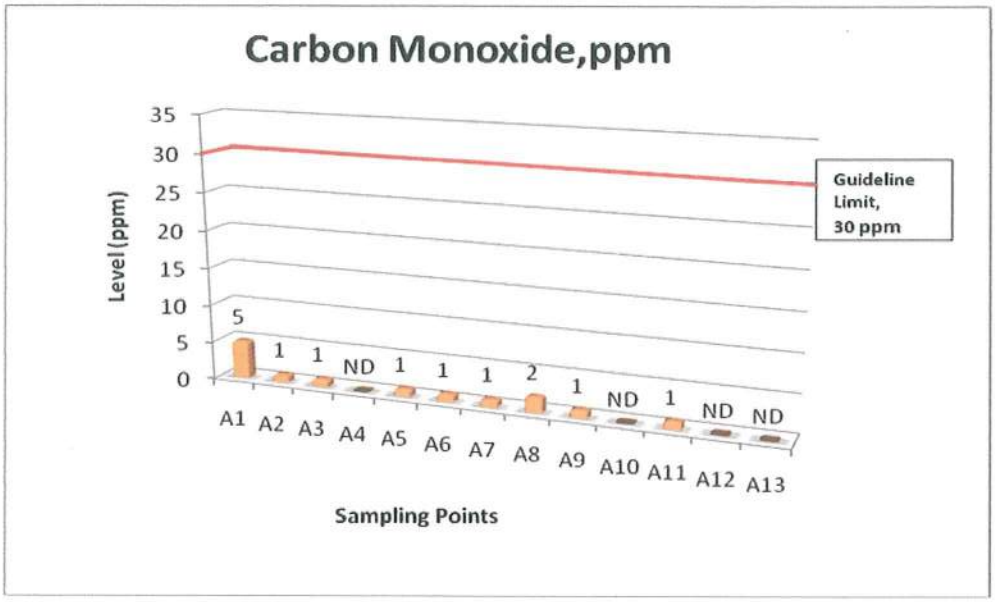
Parameter	Unit	A13	Specification	
			Averaging Time	MAAQG
Total Suspended Particulate (TSP)	$\mu g/m^3$	81	24 hours	260
Particulate Matter less than 10 micron (PM_{10})	$\mu g/m^3$	62	24 hours	150
Carbon Monoxide as CO	ppm	ND(<0)	1 hour	30
Nitrogen Dioxide as NO_2	$\mu g/m^3$	ND(<2)	24 hours	75

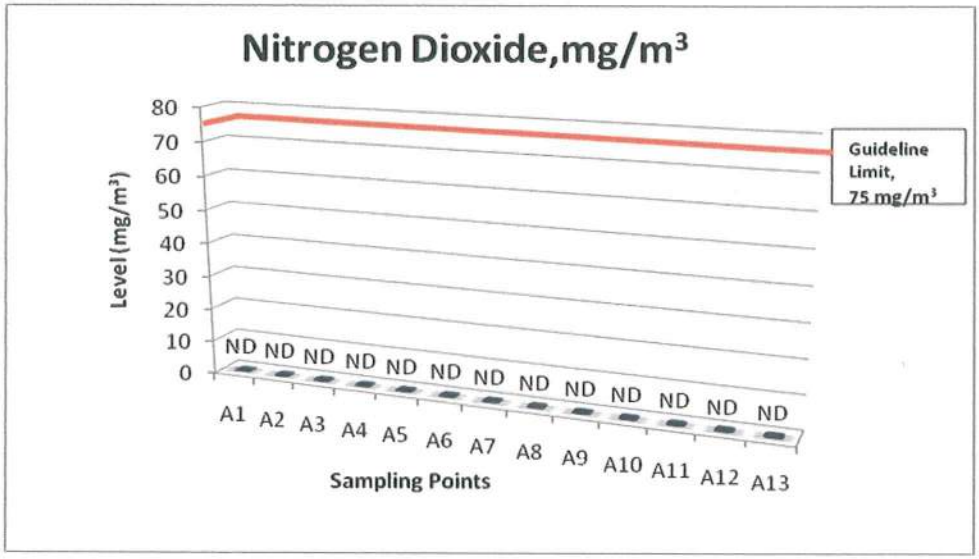
**MAAQG: Malaysian Ambient Air Quality Guidelines*
Please refer to Certificate of Analysis: **CN 1256-2014**

5.0 GRAPH OF RESULTS






Carbon Monoxide,ppm
Level (ppm)
35
30
25
20
15
10
5
0
5
1
1
ND
1
1
1
2
1
ND
1
ND
ND
A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13
Sampling Points
Guideline Limit, 30 ppm


Nitrogen Dioxide,mg/m³
Level (mg/m³)
80
70
60
50
40
30
20
10
0
ND ND ND ND ND ND ND ND ND ND ND ND ND
A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13
Sampling Points
Guideline Limit, 75 mg/m³

6.0 CONCLUSION

The Ambient Air Quality Monitoring exercise conducted for SOx NOx Asia Sdn. Bhd. (SNA) at MRT Project (SSP Line) had been completed from 26th February 2014 till 19th March 2014.

Results of the ambient air qualities are compared against the Recommended Malaysian Ambient Air Quality Guidelines (RMAAQG).The results for ambient air quality monitoring at all sampling points had **fulfilled** the prescribed limit of the respective pollutants.

Report Prepared By;

.....

Farah Hazwani Bt Mohd Zaini
Project Officer
UiTM – A & A Laboratory

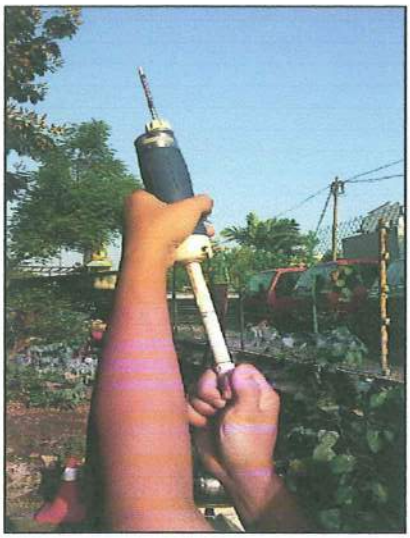
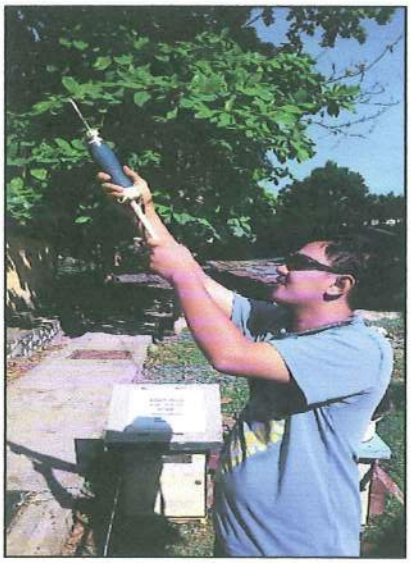
Report Verified By;

.....

Azita Ayu Abdul Halim,
BSc. (App. Chem.), MSc. (Mar. Sc.), AMIC
IKM No. A/2448/5081/2007
Laboratory Manager, UiTM – A &A Lab

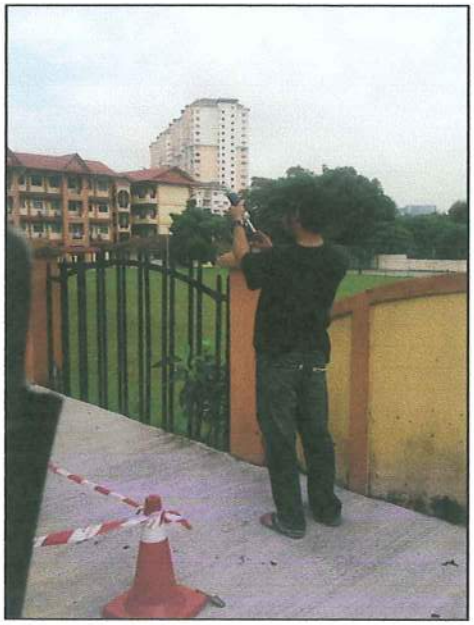
7.0 APPENDICES

- Photos of Sampling Points
- Certificate of Analysis
- Certificate of Calibration

A1: Nearby Dewi Sri Maha Mariamman temple	
	
A2: Nearby Kg.Batu PPR Flat	
	

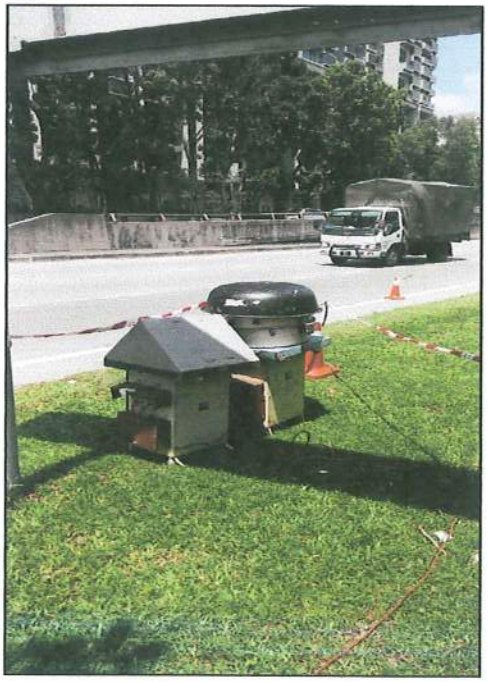
A3: Nearby General Hospital

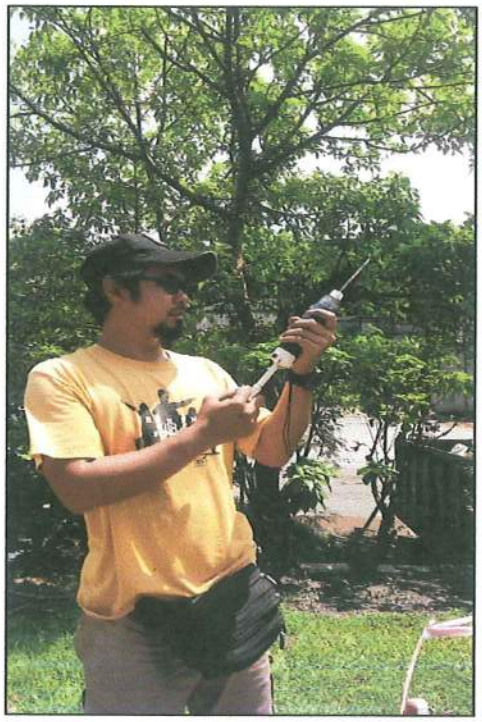
A4:Nearby Sekolah Kebangsaan Jalan Raja Muda, Kampung Baru



A5: Nearby Desa Green Service Apartment, Taman Desa

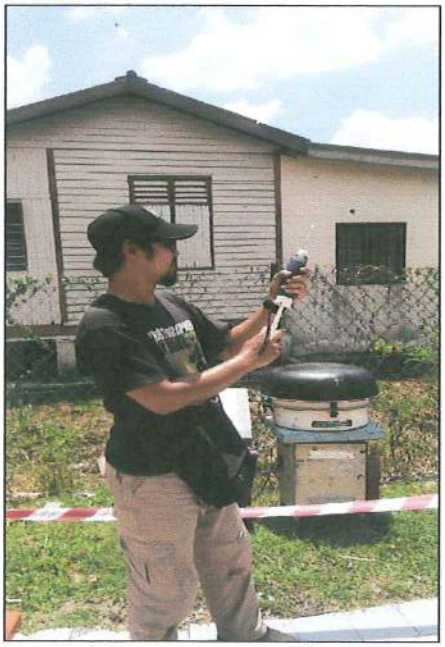
A6: Nearby the Leafz Apartment, Sungai Besi



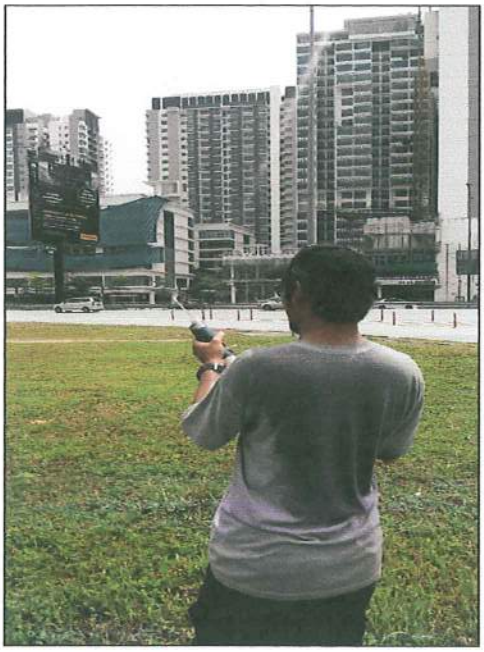


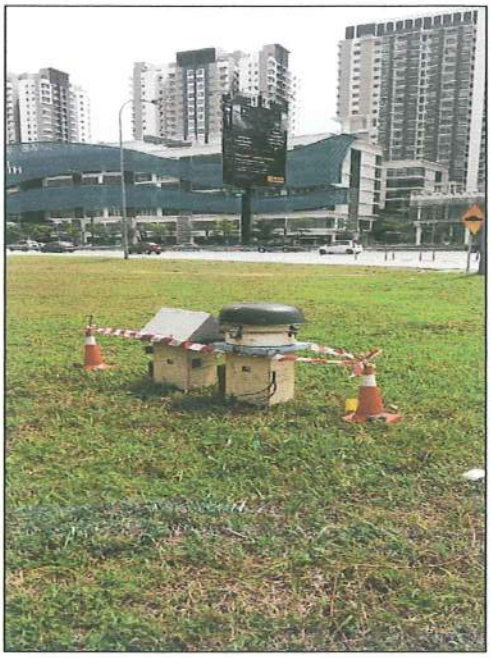
A7: Within Taman Naga Emas

A8: Nearby Sungai Besi LRT Station



A9: Nearby Plaza Serdang Raya





A10: Nearby Masjid Al-Firdaus, Taman Kembangsari

A11: Border of UPM and MARDI

A12: Nearby open space at Pinggiran Putra Petron Station, Equine Park

A13:Nearby Amigo Clubhouse, Bandar 16 Sierra

CERTIFICATE OF ANALYSIS

CERTIFICATE NO : SUPPLEMENT TEST CERTIFICATE CN 0394 - 2014
Date of Issue : 20/03/2015
Page : 1 of 2
Lab Ref. No. : 1320 - 1322/1328 - 1329/2014 - 03

Company : **ERE CONSULTING GROUP SDN BHD**
9, Jalan USJ 21/6,
47630 UEP Subang Jaya,
Selangor Darul Ehsan.

Tel: 03 - 8024 0298
Fax: 03 - 8024 4733

Attention : ***Goh Shan Min***

Date Samples Received : 21/03/2014
No. of Samples : 10 air samples
≠Samples Marking :
1320: A1 (Nearby Dewi Sri MahaMariamman temple) Sampling Date: 26 - 27/02/2014
1321: A2 (Nearby Kg.Batu PPR Flat) Sampling Date: 27 - 28/02/2014
1322: A3 (Nearby General Hospital (HKL)) Sampling Date: 03 - 04/03/2014
1329: A10 (Nearby Masjid Al- Firdaus,Taman Kembangsari) Sampling Date: 17 - 18/03/2014
1328: A11(Border of UPM and MARDI) Sampling Date: 13 - 14/03/2014

Sampling : Ambient air sampling was done by UiTM - A&A Laboratory's staff.
Location : Project MRT (SSP Line)

Results Of Analysis : Results are based on samples submitted by customer unless otherwise stated

No	Parameter	Unit	1320 A1	1321 A2	1322 A3	Recommended Malaysian Air Quality Guidelines	Analysis Method
1.	Total Suspended Particulate as TSP	$\mu g/m^3$	92	65	72	260	APHA IC 11101-01-70T
2.	Particulate Matter as PM 10	$\mu g/m^3$	60	34	38	150	APHA 11101-01-70T
3.	*Carbon Monoxide as CO	ppm	5	1	1	30	APHA 42101-07-74T
4.	Nitrogen Dioxide as NO_2	$\mu g/m^3$	ND<2	ND<2	ND<2	75	APHA IC 42602-03-73T

APHA IC: APHA Interscience Committee
* Not SAMM Accredited
≠Ammendment sample marking on 23/03/2015

.....
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A/2448/5081/2007
(Lab Manager)

STANDARDS MALAYSIA ACCREDITED LABORATORY
MS ISO/IEC 17025
TESTING
SAMM NO. 084

CERTIFICATE OF ANALYSIS

CERTIFICATE NO : SUPPLEMENT TEST CERTIFICATE CN 0394 - 2014
Date of Issue : 26/03/2014
Page : 2 of 2
Lab Ref. No. : 1320 - 1322/1328 - 1329/2014 - 03

Results Of Analysis : Results are based on samples submitted by customer unless otherwise stated

No	Parameter	Unit	1329 A10	1328 A11	Recommended Malaysian Air Quality Guidelines	Analysis Method
1.	Total Suspended Particulate as TSP	$\mu g/m^3$	78	112	260	APHA IC 11101-01-70T
2.	Particulate Matter as PM 10	$\mu g/m^3$	44	62	150	APHA 11101-01-70T
3.	*Carbon Monoxide as CO	ppm	ND<0	1	30	APHA 42101-07-74T
4.	Nitrogen Dioxide as NO_2	$\mu g/m^3$	ND<2	ND<2	75	APHA IC 42602-03-73T

APHA IC: APHA Interscience Committee
* Not SAMM Accredited
ND :Not Detected
≠Ammendment sample marking on 23/03/2015

.....
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(Lab Manager)

STANDARDS MALAYSIA ACCREDITED LABORATORY
MS ISO/IEC 17025
TESTING
SAMM NO. 084

CERTIFICATE OF ANALYSIS

CERTIFICATE NO : SUPPLEMENT TEST CERTIFICATE CN 1256 - 2014
Date of Issue : 20/03/2015
Page : 1 of 1
Lab ref No. : 5462 - 5464/2014 – 12

Company : **ERE CONSULTING GROUP SDN BHD**
9, Jalan USJ 21/6,
47630 UEP Subang Jaya,
Selangor Darul Ehsan.

Tel: 03 - 8024 0298
Fax: 03 - 8024 4733

Attention : ***Goh Shan Min***

Date Samples Received : 08/12/2014
No. of Samples : 3 Air sample
≠Sample Marking : 5462 – A4 : Nearby Sekolah Kebangsaan Jalan Raja Muda,Kg. Baru
(Sampling Date: 02 - 03/12/2014)
5463 – A13: Nearby Amigo Clubhouse Bandar 16 Sierra
(Sampling Date: 03 - 04/12/2014)
5464 – A12: Nearby open space at Pinggiran Putra Petron Station, Equine Park
(Sampling Date: 04 - 05/12/2014)

Sampling : Sampling was undertaken by UiTM - A&A Laboratory's staff.
Location : Project MRT (SSP Line)

Results Of Analysis : Results are based on samples submitted by customer unless otherwise stated

No	Parameter	Unit	5462 A4	5463 A13	5464 A12	Recommended Malaysian Air Quality Guidelines	Analysis Method
1.	Total Suspended Particulate as TSP	$\mu g/m^3$	85	81	84	260	APHA IC 11101-01-70T
2.	Particulate Matter as PM 10	$\mu g/m^3$	67	62	65	150	APHA 11101-01-70T
3.	Nitrogen Dioxide as NO_2	$\mu g/m^3$	ND<2	ND<2	ND<2	75	APHA IC 42602-03-73T
4.	*Carbon Monoxide as CO	ppm	ND<0	ND<0	ND<0	30	KITAGAWA Detector Tube

ND : Not Detectable
APHA IC: APHA Interscience Committee
≠Ammendment sample marking on 23/03/2015

.....
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(Lab Manager)

STANDARDS MALAYSIA ACCREDITED LABORATORY
MS ISO/IEC 17025
TESTING
SAMM NO. 084

CERTIFICATE OF ANALYSIS

CERTIFICATE NO : CN 0370 - 2015
Date of Issue : 23/03/2015
Page : 1 of 2
Lab Ref. No. : 1138 – 1140 & 1237 - 1238/2015- 03

Company : **ERE CONSULTING GROUP SDN BHD**
9, Jalan USJ 21/6,
47630 UEP Subang Jaya,
Selangor Darul Ehsan.

Tel: 03 - 8024 0298
Fax: 03 - 8024 4733

Attention : ***Goh Shan Min***

Date Samples Received : 13/03/2015 & 20/03/2015
No. of Samples : 5 air samples
Samples Marking : 1138: A9 (Nearby Nearby Plaza Serdang Raya) Sampling Date: 09 - 10/03/2015
1139: A8 (Nearby Sg.Besi LRT Station) Sampling Date: 10 - 11/03/2015
1140: A6 (Nearby The Leafz Apartment, Sg.Besi) Sampling Date: 11 - 12/03/2015
1237: A7 (Within Taman Naga Emas) Sampling Date: 17 - 18/03/2015
1238: A5 (Nearby Desa Green Service Apartment, Tmn Desa)
Sampling Date: 18 - 19/03/2015

Sampling : Ambient air sampling was done by UiTM - A&A Laboratory's staff.
Location : Project MRT (SSP Line)

Results Of Analysis : Results are based on samples submitted by customer unless otherwise stated

No	Parameter	Unit	1138 A9	1139 A8	1140 A6	Recommended Malaysian Air Quality Guidelines	Analysis Method
1.	Total Suspended Particulate as TSP	$\mu g/m^3$	76	89	85	260	APHA IC 11101-01-70T
2.	Particulate Matter as PM 10	$\mu g/m^3$	46	55	53	150	APHA 11101-01-70T
3.	*Carbon Monoxide as CO	ppm	1	2	1	30	APHA 42101-07-74T
4.	Nitrogen Dioxide as NO_2	$\mu g/m^3$	ND<2	ND<2	ND<2	75	APHA IC 42602-03-73T

APHA IC: APHA Interscience Committee
* Not SAMM Accredited

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A/2448/5081/2007
(Lab Manager)

STANDARDS MALAYSIA ACCREDITED LABORATORY
MS ISO/IEC 17025
TESTING
SAMM NO. 084

CERTIFICATE OF ANALYSIS

CERTIFICATE NO : CN 0370 - 2015
Date of Issue : 23/03/2015
Page : 2 of 2
Lab Ref. No. : 1138 – 1140 & 1237 - 1238/2015- 03

Results Of Analysis : Results are based on samples submitted by customer unless otherwise stated

No	Parameter	Unit	1237 A7	1238 A5	Recommended Malaysian Air Quality Guidelines	Analysis Method
1.	Total Suspended Particulate as TSP	$\mu g/m^3$	72	94	260	APHA IC 11101-01-70T
2.	Particulate Matter as PM 10	$\mu g/m^3$	45	58	150	APHA 11101-01-70T
3.	*Carbon Monoxide as CO	ppm	1	1	30	APHA 42101-07-74T
4.	Nitrogen Dioxide as NO_2	$\mu g/m^3$	ND<2	ND<2	75	APHA IC 42602-03-73T

APHA IC: APHA Interscience Committee
* Not SAMM Accredited
ND :Not Detected

.....
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BSc(App.Chem), MSc(Mar.Sc), AMIC
A/2448/5081/2007
(Lab Manager)

UiTM - A&A Laboratory : Bangunan Makmal Penyelidikan Alam Sekitar, Kolej Kediaman Kenanga 2, Zon C,
Jalan Bernas 1/10D, Universiti Teknologi Mara, 40450 Shah Alam, Selangor Darul Ehsan
Tel : 603-5512 0663 Fax : 603-5510 3701 Website : www.environment.com.my

SPECTRUM LABORATORIES SDN. BHD.
Lot 14 (PT 5015), Jalan Pendamar 27/90, Seksyen 27, 40000 Shah Alam,
Selangor Darul Ehsan, Malaysia. Tel: 603-5192 8188 Fax: 603-5191 8188
(Company No. 167225-U)

ERE CONSULTING GROUP SDN BHD

WATER QUALITY MONITORING

FOR

"PROJEK MASS RAPID TRANSIT LALUAN 2 : SG. BULOH - SERDANG - PUTRAJAYA"

ON

4TH & 5TH DECEMBER 2014

LAB. NO.	: E/W/1412/2137&2159
OUR REF.	: F:/DEPT/WATER/ERE/1412/2137&2159
DATE MONITORED	: 4TH & 5TH DECEMBER 2014
DATE REPORTED	:16TH DECEMBER 2014

CONTENTS

1.0 AIM

To conduct a survey of the water quality at various selected locations for "Projek Mass Rapid Transit Laluan 2 : Sg. Buloh - Serdang - Putrajaya".

2.0 INTRODUCTION

A study of the water quality was conducted on 4th and 5th December 2014 at various selected locations along the proposed project site from Sg. Buloh - Serdang - Putrajaya.

Prior to the actual on-site water sampling, a preliminary site survey was performed to confirm the sampling locations.

Sampling personnel :	Mr. Megat Hairol Anuar	(Field Technician)
	Mr. Shaiful Azrin	(Field Technician)

3.0 METHODOLOGY (CONTD.)

3.4 Analysis

On-site testing of the pH, Temperature and Dissolved Oxygen were conducted. The water samples were then brought back to the laboratory for analysis.

Parameter	Method
On-site	
* pH	APHA 4500-H^+B, 2005
* Temperature	APHA 2550 B, 2005
* Dissolved Oxygen	APHA 4500-O G, 2005
Laboratory	**Method**
* Chemical Oxygen Demand (COD)	APHA 5220 C, 2005
* Biochemical Oxygen Demand (BOD_5)	APHA 5210 B & APHA 4500-O G, 2005
* Total Suspended Solids	APHA 2540 D, 2005
* Oil & Grease	APHA 5520 B, 2005
* Ammoniacal Nitrogen as NH_3	APHA 4500-NH_3 B & F, 2005
E. coli count	In-House Method-Micro-02 (Based on APHA 9222 G)
* Arsenic as As	APHA 3114 C, 2005
* Cadmium as Cd	APHA 3120 B, 2005
* Chromium, Total as Cr	APHA 3120 B, 2005
* Copper as Cu	APHA 3120 B, 2005
* Iron as Fe	APHA 3120 B, 2005
* Lead as Pb	APHA 3120 B, 2005
* Mercury as Hg	APHA 3112 B, 2005
* Manganese as Mn	APHA 3120 B, 2005
* Nickel as Ni	APHA 3120 B, 2005
* Zinc as Zn	APHA 3120 B, 2005

Note : * means SAMM Accredited

Method Reference :

APHA means Standard Methods for the Examination of Water & Wastewater, 21st Edition, 2005; American Public Health Association (APHA), American Waterworks Association (AWWA) & Water Environment Federation (WEF).

3.0 METHODOLOGY

3.1 Site Survey

Possible sources of contamination and physical characteristics of the water at the points of sampling were observed.

3.2 Sampling Points

Fourteen (14) sampling points were selected for water quality monitoring as follows:

Point	Location	Coordinates
W1	Sg. Gasi	N 03° 11' 57.3" E 101° 35' 40.6"
W2	Sg. Gasi (2)	N 03° 11' 54.9" E 101° 36' 35.1"
W3	Sg Keroh	N 03° 12' 49.9" E 101° 37' 57.4"
W4	Sg Jinjang	N 03° 12' 34.7" E 101° 39' 23.4"
W5	Sg. Batu	N 03° 12' 20.2" E 101° 40' 06.0"
W6	Sg. Batu (2)	N 03° 12' 14.8" E 101° 40' 33.4"
W7	Sg. Gombak	N 03° 10' 25.8" E 101° 41' 42.8"
W8	Sg. Bunus	N 03° 10' 10.6" E 101° 42' 38.7"
W9	Sg. Klang	N 03° 09' 56.4" E 101° 42' 55.1"
W10	Sg. Kerayong	N 03° 07' 49.1" E 101° 44' 24.0"

3.0 METHODOLOGY

3.2 Sampling Points (Contd.)

Fourteen (14) sampling points were selected for water quality monitoring as follows: (Contd.)

Point	Location	Coordinates
W11	Sg. Seputeh	N 03° 07' 57.8" E 101° 45' 45.4"
W12	Sg. Balak	N 03° 03' 28.2" E 101° 44' 42.0"
W13	Sg. Kuyoh	N 03° 01' 10.5" E 101° 42' 33.9"
W14	Cyberjaya Lake	N 03° 56' 43.2" E 101° 39' 36.8"

3.3 Collection Of Samples

Water samples were collected from ten selected points between 1.55 pm - 5.45 pm on 4th December 2014 and from four selected point between 10.15 am - 11.35 am on 5th December 2014 . Grab samples were collected and preserved in an ice box prior to being transported back to the laboratory for chemical analysis. The sampling for the points were carried out for one day and during sampling, the weather was fine.

4.0 ANALYSIS RESULTS

Table 1 : Analysis Results of Water Quality Monitoring for "Projek Mass Rapid Transit Laluan 2: Sg. Buloh - Serdang - Putrajaya" monitored on 4th & 5th December 2014

Test Parameters	Units	W1	W2	W3	W4
Date Collected		04/12/14	04/12/14	04/12/14	04/12/14
Time Collected		1.57 pm	1.20 pm	2.56 pm	3.16 pm
pH (on-site)		6.3	6.3	6.7	6.6
Temperature (on-site)	° C	29	30	30	29
Dissolved Oxygen (on-site)	mg/l	5.1	5.1	5.3	5.5
COD	mg/l	69	94	88	66
BOD_5	mg/l	13	18	17	13
Total Suspended Solids	mg/l	179	130	205	219
Oil & Grease	mg/l	ND(<1)	ND(<1)	ND(<1)	ND(<1)
Ammoniacal Nitrogen as NH_3-N	mg/l	2.93	1.58	2.11	3.59
E.coli count	CFU/100ml	350	450	420	310
Arsenic as As	mg/l	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)
Cadmium as Cd	mg/l	ND(<0.001)	ND(<0.001)	0.001	0.003
Chromium, Total as Cr	mg/l	0.020	0.008	0.011	0.001
Copper as Cu	mg/l	0.076	0.061	0.042	0.058
Iron as Fe	mg/l	4.979	2.827	3.592	2.573
Lead as Pb	mg/l	ND(<0.006)	0.006	ND(<0.006)	ND(<0.006)
Mercury as Hg	mg/l	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)
Manganese as Mn	mg/l	0.130	0.102	0.106	0.113
Nickel as Ni	mg/l	0.016	0.025	0.021	0.008
Zinc as Zn	mg/l	0.712	0.481	0.504	0.389

Note : 1) < means Less than
2) ND means Not Detected

4.0 ANALYSIS RESULTS (CONTD.)

Table 2 : Analysis Results of Water Quality Monitoring for "Projek Mass Rapid Transit Laluan 2: Sg. Buloh - Serdang - Putrajaya" monitored on 4th & 5th December 2014

Test Parameters	Units	W5	W6	W7	W8
Date Collected		04/12/14	04/12/14	04/12/14	04/12/14
Time Collected		3.27 pm	3.48 pm	4.07 pm	4.32 pm
pH (on-site)		6.9	7.0	7.1	6.9
Temperature (on-site)	° C	30	31	27	29
Dissolved Oxygen (on-site)	mg/l	5.9	5.9	5.8	5.9
COD	mg/l	6	6	9	6
BOD_5	mg/l	1	1	2	1
Total Suspended Solids	mg/l	16	12	16	18
Oil & Grease	mg/l	ND(<1)	ND(<1)	ND(<1)	ND(<1)
Ammoniacal Nitrogen as NH_3-N	mg/l	0.30	0.03	0.22	0.02
E.coli count	CFU/100ml	39	22	34	16
Arsenic as As	mg/l	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)
Cadmium as Cd	mg/l	0.005	0.001	ND(<0.001)	ND(< 0.006)
Chromium, Total as Cr	mg/l	0.002	0.008	0.010	0.002
Copper as Cu	mg/l	0.027	0.027	0.016	0.046
Iron as Fe	mg/l	2.893	2.802	3.507	4.592
Lead as Pb	mg/l	0.170	0.062	ND(<0.006)	0.053
Mercury as Hg	mg/l	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)
Manganese as Mn	mg/l	0.361	0.404	0.513	0.396
Nickel as Ni	mg/l	0.035	ND(<0.006)	ND(<0.006)	0.010
Zinc as Zn	mg/l	0.302	0.297	0.243	0.250

Note : 1) < means Less than
2) ND means Not Detected

4.0 ANALYSIS RESULTS (CONTD.)

Table 3 : Analysis Results of Water Quality Monitoring for "Projek Mass Rapid Transit Laluan 2: Sg. Buloh - Serdang - Putrajaya" monitored on 4th & 5th December 2014

Test Parameters	Units	W9	W10	W11	W12
Date Collected		04/12/14	04/12/14	04/12/14	05/12/14
Time Collected		5.03 pm	5.24 pm	5.43 pm	10.19 am
pH (on-site)		6.3	6.2	6.1	6.8
Temperature (on-site)	° C	30	29	30	27
Dissolved Oxygen (on-site)	mg/l	5.1	5.4	5.2	5.4
COD	mg/l	81	9	3	19
BOD_5	mg/l	17	2	ND(<1)	3
Total Suspended Solids	mg/l	214	16	16	4
Oil & Grease	mg/l	ND(<1)	ND(<1)	ND(<1)	ND(<1)
Ammoniacal Nitrogen as NH_3-N	mg/l	0.08	0.08	0.04	0.01
E.coli count	CFU/100ml	440	26	<1	<1
Arsenic as As	mg/l	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)
Cadmium as Cd	mg/l	ND(<0.001)	ND(<0.001)	ND(<0.001)	0.003
Chromium, Total as Cr	mg/l	0.008	0.018	0.011	ND(<0.001)
Copper as Cu	mg/l	0.060	0.008	0.014	0.018
Iron as Fe	mg/l	3.319	3.423	2.635	1.045
Lead as Pb	mg/l	0.102	0.045	0.636	ND(<0.006)
Mercury as Hg	mg/l	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)
Manganese as Mn	mg/l	0.085	0.380	0.330	0.230
Nickel as Ni	mg/l	0.003	0.022	0.069	0.008
Zinc as Zn	mg/l	0.282	0.218	0.160	0.054

Note : 1) < means Less than
2) ND means Not Detected

4.0 ANALYSIS RESULTS (CONTD.)

Table 3 : Analysis Results of Water Quality Monitoring for "Projek Mass Rapid Transit Laluan 2: Sg. Buloh - Serdang - Putrajaya" monitored on 4th & 5th December 2014

Test Parameters	Units	W13	W14
Date Collected		05/12/14	05/12/14
Time Collected		10.57 am	11.32 am
pH (on-site)		6.8	7.0
Temperature (on-site)	° C	27	27
Dissolved Oxygen (on-site)	mg/l	5.5	5.6
COD	mg/l	32	13
BOD_5	mg/l	6	2
Total Suspended Solids	mg/l	14	10
Oil & Grease	mg/l	ND(<1)	ND(<1)
Ammoniacal Nitrogen as NH_3-N	mg/l	0.06	0.45
E.coli count	CFU/100ml	<1	<1
Arsenic as As	mg/l	ND(<0.01)	ND(<0.01)
Cadmium as Cd	mg/l	0.003	0.002
Chromium, Total as Cr	mg/l	ND(<0.001)	ND(<0.001)
Copper as Cu	mg/l	0.009	0.011
Iron as Fe	mg/l	4.471	0.865
Lead as Pb	mg/l	ND(<0.006)	ND(<0.006)
Mercury as Hg	mg/l	ND(<0.001)	ND(<0.001)
Manganese as Mn	mg/l	0.220	0.195
Nickel as Ni	mg/l	0.044	0.082
Zinc as Zn	mg/l	0.195	0.031

Note : 1) < means Less than
2) ND means Not Detected

5.0 INFERENCE

The objective of the water quality monitoring has been carried out and the results are as reported.

.....

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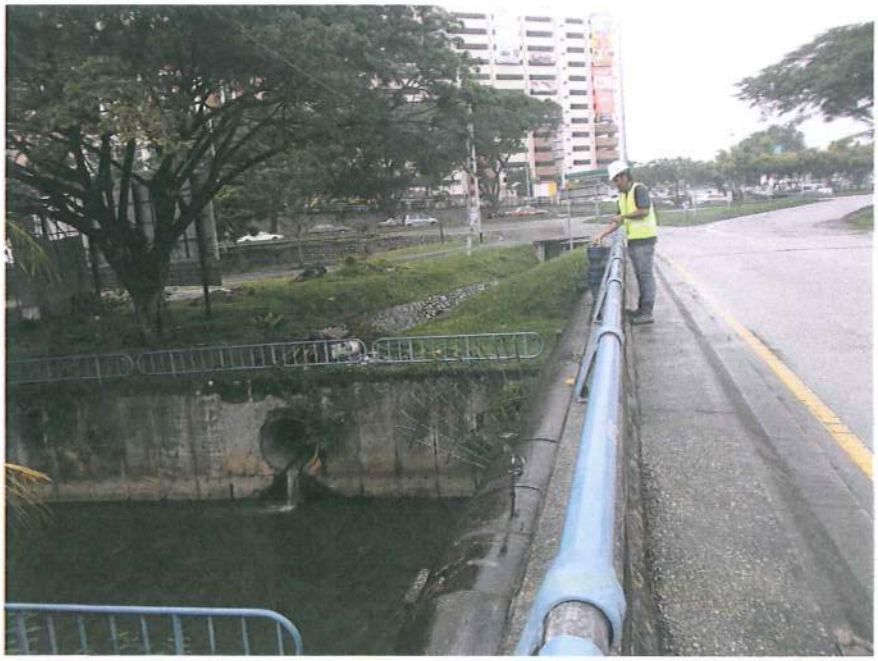
WATER QUALITY MONITORING AT POINT W1

WATER QUALITY MONITORING AT POINT W2

WATER QUALITY MONITORING AT POINT W3

WATER QUALITY MONITORING AT POINT W4



WATER QUALITY MONITORING AT POINT W5

WATER QUALITY MONITORING AT POINT W6

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WATER QUALITY MONITORING AT POINT W9

WATER QUALITY MONITORING AT POINT W10

WATER QUALITY MONITORING AT POINT W11

WATER QUALITY MONITORING AT POINT W12

WATER QUALITY MONITORING AT POINT W13

WATER QUALITY MONITORING AT POINT W14

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ERE CONSULTING GROUP SDN BHD

WATER QUALITY MONITORING

FOR

"PROJEK MASS RAPID TRANSIT LALUAN 2 : SG. BULOH - SERDANG - PUTRAJAYA"

ON

13TH MARCH 2015

LAB. NO.	: E/W/1503/2938
OUR REF.	: F:/DEPT/WATER/ERE/1503/2938
DATE MONITORED	: 13TH MARCH 2015
DATE REPORTED	: 27TH MARCH 2015

SPECTRUM

CONTENTS

1.0 AIM

To conduct a survey of the water quality at various selected locations for "Projek Mass Rapid Transit Laluan 2 : Sg. Buloh - Serdang - Putrajaya".

2.0 INTRODUCTION

A study of the water quality was conducted on 13th March 2015 at various selected locations along the proposed project site from Sg. Buloh - Serdang - Putrajaya.

Prior to the actual on-site water sampling, a preliminary site survey was performed to confirm the sampling locations.

Sampling personnel :	Mr. Faizal	(Field Technician)
	Mr. Syukri	(Field Technician)

3.0 METHODOLOGY

3.1 Site Survey

Possible sources of contamination and physical characteristics of the water at the points of sampling were observed.

3.2 Sampling Points

Six (6) sampling points were selected for water quality monitoring as follows:

Point	Location	Coordinates
W1	Sg. Kerayong	N 03° 07' 13.1" E 101° 42' 27.9"
W2	Sg. Kerayong	N 03° 05' 45.4" E 101° 41' 42.3"
W3	Sg. Kuyoh	N 03° 00' 43.9" E 101° 42' 35.4"
W4	MARDI pond	N 02° 59' 59.1" E 101° 41' 16.6"
W5	Sg. Gajah	N 02° 57' 11.3" E 101° 39' 26.9"
W6	Sek Tunas Bakti Sg. Besi pond	N 03° 04' 38.7" E 101° 41' 57.5"

3.3 Collection Of Samples

Water samples were collected from six selected points between 10.15 am - 6.25 pm on 13th March 2015. Grab samples were collected and preserved in an ice box prior to being transported back to the laboratory for chemical analysis. The sampling for the points were carried out for one day and during sampling, the weather was fine.

3.0 METHODOLOGY (CONTD.)

3.4 Analysis

On-site testing of the pH, Temperature and Dissolved Oxygen were conducted. The water samples were then brought back to the laboratory for analysis.

Parameter	Method
On-site	
* pH	APHA 4500-H^+B, 2005
* Temperature	APHA 2550 B, 2005
* Dissolved Oxygen	APHA 4500-O G, 2005
Laboratory	**Method**
* Chemical Oxygen Demand (COD)	APHA 5220 C, 2005
* Biochemical Oxygen Demand (BOD_5)	APHA 5210 B & APHA 4500-O G, 2005
* Total Suspended Solids	APHA 2540 D, 2005
* Oil & Grease	APHA 5520 B, 2005
* Ammoniacal Nitrogen as NH_3	APHA 4500-NH_3 B & F, 2005
E. coli count	In-House Method-Micro-02 (Based on APHA 9222 G)
* Arsenic as As	APHA 3114 C, 2005
* Cadmium as Cd	APHA 3120 B, 2005
* Chromium, Total as Cr	APHA 3120 B, 2005
* Copper as Cu	APHA 3120 B, 2005
* Iron as Fe	APHA 3120 B, 2005
* Lead as Pb	APHA 3120 B, 2005
* Mercury as Hg	APHA 3112 B, 2005
* Manganese as Mn	APHA 3120 B, 2005
* Nickel as Ni	APHA 3120 B, 2005
* Zinc as Zn	APHA 3120 B, 2005

Note : * means SAMM Accredited

Method Reference :

APHA means Standard Methods for the Examination of Water & Wastewater, 21st Edition, 2005; American Public Health Association (APHA), American Waterworks Association (AWWA) & Water Environment Federation (WEF).

4.0 ANALYSIS RESULTS

Table 1 : Analysis Results of Water Quality Monitoring for "Projek Mass Rapid Transit Laluan 2: Sg. Buloh - Serdang - Putrajaya" monitored on 13th March 2015

Test Parameters	Units	W1	W2	W3
Date Collected		13/03/15	13/03/15	13/0315
Time Collected		3.22 pm	2.49 pm	10.16 am
pH (on-site)		6.4	6.3	6.5
Temperature (on-site)	° C	29	29	29
Dissolved Oxygen (on-site)	mg/l	6.0	6.4	6.5
COD	mg/l	16	23	16
BOD_5	mg/l	3	4	3
Total Suspended Solids	mg/l	4	3	14
Oil & Grease	mg/l	ND(<1)	ND(<1)	ND(<1)
Ammoniacal Nitrogen as NH_3-N	mg/l	0.70	0.08	0.07
E.coli count	CFU/100ml	<1	<1	<1
Arsenic as As	mg/l	ND(<0.01)	ND(<0.01)	ND(<0.01)
Cadmium as Cd	mg/l	0.004	0.006	ND(<0.001)
Chromium, Total as Cr	mg/l	ND(<0.001)	ND(<0.001)	ND(<0.001)
Copper as Cu	mg/l	0.007	ND(<0.001)	ND(<0.001)
Iron as Fe	mg/l	1.469	1.121	1.137
Lead as Pb	mg/l	ND(<0.006)	ND(<0.006)	ND(<0.006)
Mercury as Hg	mg/l	ND(<0.001)	ND(<0.001)	ND(<0.001)
Manganese as Mn	mg/l	0.032	0.027	0.032
Nickel as Ni	mg/l	ND(<0.006)	ND(<0.006)	ND(<0.006)
Zinc as Zn	mg/l	0.016	0.062	0.077

Note : 1) < means Less than
2) ND means Not Detected

4.0 ANALYSIS RESULTS (CONTD.)

Table 2 : Analysis Results of Water Quality Monitoring for "Projek Mass Rapid Transit Laluan 2: Sg. Buloh - Serdang - Putrajaya" monitored on 13th March 2015

Test Parameters	Units	W4	W5	W6
Date Collected		13/031/5	13/03/15	13/0315
Time Collected		12.13 pm	6.22 pm	2.15 pm
pH (on-site)		6.1	6.3	6.2
Temperature (on-site)	° C	29	29	29
Dissolved Oxygen (on-site)	mg/l	6.7	6.5	6.4
COD	mg/l	29	23	16
BOD_5	mg/l	5	4	3
Total Suspended Solids	mg/l	12	6	6
Oil & Grease	mg/l	ND(<1)	ND(<1)	ND(<1)
Ammoniacal Nitrogen as NH_3-N	mg/l	0.20	0.57	0.22
E.coli count	CFU/100ml	<1	<1	<1
Arsenic as As	mg/l	ND(<0.01)	ND(<0.01)	ND(<0.01)
Cadmium as Cd	mg/l	0.004	0.001	ND(<0.001)
Chromium, Total as Cr	mg/l	ND(<0.001)	ND(<0.001)	ND(<0.001)
Copper as Cu	mg/l	0.009	0.018	0.011
Iron as Fe	mg/l	1.192	1.461	1.046
Lead as Pb	mg/l	ND(<0.006)	ND(<0.006)	ND(<0.006)
Mercury as Hg	mg/l	ND(<0.001)	ND(<0.001)	ND(<0.001)
Manganese as Mn	mg/l	0.075	0.032	0.021
Nickel as Ni	mg/l	ND(<0.006)	ND(<0.006)	ND(<0.006)
Zinc as Zn	mg/l	0.074	0.059	0.092

Note : 1) < means Less than
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5.0 INFERENCE

The objective of the water quality monitoring has been carried out and the results are as reported.

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